

DEMOGRAPHIC DEBATE

Education will be at the heart of 21st century demography

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At the end of the last century, *Population and Development Review* (PDR) published an article with the visionary title “Demographic dimensions in forecasting: adding education to age and sex” (Lutz et al. 1999). In this contribution the authors (W. Lutz, A. Goujon and G. Doblhammer-Reiter) systematically discuss the criteria governing the choice of particular dimensions (i.e. covariates, breakdowns or sources of heterogeneity) that should be explicitly and routinely addressed in demographic analysis. The three criteria were: (1) “To the users the dimension is interesting in its own right and therefore desirable as an explicit output parameter”; (2) “The dimension is a relevant source of demographic heterogeneity with an impact on the dynamics of the whole system and therefore on the resulting population size”; and (3) “It is feasible (in terms of data and methodology) to consider the dimensions explicitly” (Lutz et al. 1999: 42). Each criterion is then applied to a series of candidates: age, sex, legal marital status, place of residence, educational attainment, ethnicity, region of origin and others. While many of these dimensions seem to be of great substantive importance for specific research questions, only three are seen to meet all three criteria and are hence considered candidates for standard demographic analysis. Not surprisingly, age and sex are among them, while the third recommended standard dimension is the level of educational attainment.

As discussed in detail in the PDR paper, educational status is considered of paramount substantive interest for a large array of social, economic and health-related questions in developing and industrialised countries alike (criterion 1). Its inclusion may change aggregate population projections significantly, particularly in the presence of pronounced fertility and mortality differentials by education together with strong changes in educational attainment across cohorts (criterion 2). Finally, formal educational attainment can be rather unambiguously defined

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and measured by censuses and surveys in all countries and the methods of multi-state demography are readily applicable to modelling its dynamics over time (criterion 3). The authors also stress that formal attainment does not cover the full range of education-related effects (which include the quality and the specific content of education as well as informal education channels), but they point to analyses showing that for certain outcomes, formal attainment is a good proxy for these other dimensions that are more difficult to measure systematically across countries. But this may not be the case for other outcomes and more research along these lines is certainly needed.

In the concluding section the authors wonder about the “almost entire neglect of this promising approach” by international agencies and most demographer colleagues. They provide two possible explanations: “relevant decisionmakers are not yet aware of the availability of appropriate and easy-to-use methods for population projections by education, and demographers who know about the methods have not taken up the subject because they did not consider education as part of their field of studies” (Lutz et al. 1999: 57). From today’s perspective we may add two further reasons: conceptual and methodological inertia of individual researchers and paradigm inertia of disciplinary fields.

Having entered the 21st century, the case for incorporating education into the core of demographic analysis has become even stronger and goes far beyond the field of population projections which was the context of the PDR paper. This is due to some significant changes in the real world, but even more importantly, to our changing interpretations of those changes.

Age is not what it used to be, nor is sex

One important counterargument to viewing educational attainment as a basic demographic dimension is that age and sex are somehow natural covariates, while education is purely a social construction. Moreover, sociologists often like to view education primarily as a reflection of social status rather than something that changes our minds and causes us to behave differently than we would have behaved without education. These are indeed serious concerns that require significant research and discussions. In the context of this short commentary, however, I can only highlight a few relevant thoughts. I will address the first concern in this section and the second in the following.

Our thinking about age is dominated by what is often called “fixed chronological age” which is the time elapsed since birth as measured in years. However, there are many different ways of looking at age and ageing, referring to biological, mental or social maturity. These different conceptions of age are not only constructed by scientists but are deeply embedded in various traditional cultures. For instance, demographers in Australia have serious problems constructing life tables for the aboriginal population because in their culture people often do not know their chronological age, since age and ageing is seen primarily as a succession through different life cycle phases that vary in length

according to different dimensions of maturity, typically assessed by the elders. But even in our modern Western societies, it has become fashionable to point out the many shortcomings of the deeply engrained concept of chronological age as a basic determinant of behaviour and social organisation. This has been reflected in recent anti-age discrimination legislation where it has become illegal to use chronological age as a decisive criterion for many relevant decisions. Even in academia, we are moving away from chronological age as a criterion for, e.g. support of ‘young’ scientists to duration-defined criteria such as time since doctorate. But probably the most relevant change has been our rethinking of the meaning of age with respect to our health status and remaining life expectancy. It has become a common saying that “40 is the new 30” or “60 is the new 50” implying that people aged 60 today are equivalent in many important dimensions to those aged 50 some time ago. And there is good scientific evidence to back up this popular perception.

Demographers are slowly picking up these new ideas about redefining age and ageing. Recently, a series of high-profile publications in *Science* and *Nature* (Sanderson and Scherbov 2005 and 2010; Lutz et al. 2008b) discussed the issue and proposed different indicators of ageing that adjust for remaining life expectancy or disability status. But the idea of adjustment is not new. Ryder (1975) and Jacob and Siegel (1993) made suggestions in this direction. Fuchs (1984) made the more general point that ages should be adjusted routinely for changing life expectancy in the same way that financial variables are adjusted for inflation. Sanderson and Scherbov (2005) and Lutz et al. (2008b) were the first to apply these ideas to recalculating adjusted ageing indicators on a global level. Most recently, Sanderson and Scherbov (2010) published adjustments based on trends in age-specific disability rates rather than just mortality. They write: “Disability-free life expectancies, which describe how many years of life are spent in good health, have also been increasing, often as fast as unconditional life expectancies, because of decreases in age-specific disability rates. For example, in the United States, the proportion disabled in the age group 65 to 74 declined from 14.2% in 1982 to 8.9% in 2004-05. Thus, fixed chronological ages do not work well in evaluating the effect of age structure changes on health care costs, because most of those costs occur in the last few years of life, which happen at ever later ages as life expectancies increase” (Sanderson and Scherbov 2010: 1287).

Not only traditional chronological age has been losing some of its presumably ‘natural’ explanatory power; the ubiquitous distinction between men and women is also starting to forfeit some of its self-evident nature and is increasingly understood to be a social construction. Even the purely biological distinction between the two sexes is not as clear as it was assumed to be. In September 2010, the Austrian media were full of reports about two male teachers who, after the summer break, returned to their schools as women. In general, the issue of transsexuality is receiving more attention, also from a human rights perspective. In this regard demographers have become the target of accusations of

discrimination: some time ago during a European demographic meeting, a significantly sized group of transgender activists in the audience verbally attacked the demographic speakers (including myself) for forcing people into dichotomous categories of either male or female, hence violating their human right to see themselves as neither or both or even a third category. They claimed that this issue would affect some 5-7 per cent of the entire population, a number that seems difficult to verify. After a lengthy discussion—in which in the end we began to look for practical solutions to what would be good ways to carry out demographic analysis without giving these persons the feeling of having their personal human rights violated—the proposal was made to add a third category of ‘undetermined’ in addition to male and female. This is actually in line with current practice in censuses and surveys with respect to questions about ethnicity, race, language use, etc. The problem with sex, however, is that the dichotomy is also encoded in most of our legal systems and hence is not only up to demographers to change.

With respect to the much more socially-determined gender roles and norms, there is little doubt that the traditional male/female distinction is increasingly blurred. This entails less clearly distinguishable behavioural patterns that are very relevant for two of the three most basic demographic components: mortality and migration. It seems quite clear that a certain portion of the male/female difference in life expectancy is due to behavioural factors (such as different rates of smoking) which have been changing rapidly over the past years. The same is true for migration, where an increase in female labour force participation is leading to more female labour migration. With respect to fertility the complete dominance of the female perspective in demographic analysis may be due to the fact that we do not even consistently register and measure male fertility. But some new surveys, such as the Generations and Gender Programme (GGP) are beginning to change this and also study reproductive decision making from the male perspective.

In sum, in 21st century demography traditional age and gender distinctions are in the process of losing their previously unquestioned ‘natural’ and absolute deterministic power, while at the same time educational attainment is increasingly recognised as a key determinant of our behaviour and our fate with significant educational differentials from cradle to grave. Hence, we no longer face a situation in which there are presumably natural factors (age and sex) on an ontologically different level from other factors that are assumed to be merely social construction (such as educational attainment). We now understand that all three factors have elements of social construction as well as elements of underlying determinism. At this point of the epistemological evolution the question of how to deal with these different demographic dimensions is more at the pragmatic level of which of the factors meet the three criteria for standard use in demographic analysis as discussed above. Here there is no doubt that age, sex and education will continue to serve important functions.

Our brains and our wallets are very different organs: disentangling SES

Those of us with some sociological training have been indoctrinated to always and in every respect stratify the populations we study by socio-economic status (SES). This is what we learned to do and this is what almost everybody in the field does presumably as a consequence of the dominant sociological paradigm of social class stratification. But since SES cannot directly be measured with people, demographers in line with other social scientists routinely use education and/or income variables as proxies for SES, saying that they really want to measure SES, not education or income. But once you start thinking about it, it is not clear why anybody would be more interested in studying demographic variables with respect to the rather fuzzy idea of SES rather than more directly with respect to the clearly measured educational attainment or household income/wealth. The former would only be justified if indeed we believed that SES and the implied rank order in society were the real ‘thing’ lying behind our social behaviours and outcomes, a stance that will be further discussed below. From a policy perspective, however, it actually seems highly desirable to distinguish between the effects of income and those of education because the resulting policies would be very different: increasing school enrolment or improving the quality of education, on the one hand; providing financial subsidies of various kinds to households, on the other.

These alternative policies—providing education versus providing money—are not only very different in terms of the processes of implementation (education ministries versus social ministries) and the age groups that are being typically targeted (the younger ones versus all ages with a heavy emphasis on subsidised pensions in Europe). They also affect very different ‘organs’ in each of us. Education only affects our brains; we learn certain basic skills such as reading, writing and calculus. More importantly, good education teaches us to critically examine the world around us, enabling us to better anticipate, in a changing world, likely future threats and opportunities to our own well-being and to that of our societies. These cognitive skills and ways of thinking have, in principle, nothing to do with the state of our other important ‘organ’, namely, whether we or our parents have thick or thin wallets at the time of learning (given that a certain minimum of health, nutrition and emotional stability is warranted). As time goes by, of course, higher brain power is likely to translate into higher income and hence contributes to the thickening of wallets. There are many other factors that contribute to the thickness of our wallets, though: inheriting a fortune (in particular when it is due to privilege rather than one’s parents’ own efforts) or winning in the lottery is completely independent of our own brain power; but even in terms of earnings of one’s own the biggest earners are often not the most educated. Conversely, the most educated (academicians, professors, teachers, priests, etc.) are usually not among the top earners—but they are at the top in terms of health and life expectancy, because education influences their lifestyles (Doblhammer et al. 2008; Winkler-Dworak 2008). Hence, for all these reasons it

seems to make a lot of sense to try to study the effects of education on our brains and of income/transfers on our wallets as separate processes that actually follow quite different mechanisms and dynamics. This will allow us to study with more conceptual clarity the undoubtedly important influences of our brains on our wallets and vice versa.

The only case in which it would indeed be irrelevant to study educational differentials apart from socio-economic differentials would be if education did nothing to our minds that was relevant for our behaviour. Such a position would assume that educational attainment is merely a reflection of pre-existing distributions of social stratification. While there is no doubt that there is an element of ‘inheritance’ in educational attainment in the sense that more educated parents see it as very important to have their children well educated, there is also no doubt that indeed education does something to the minds of these children that they would not have without it. If that were not the case, all the government funds on education would be wasted money and Millennium Development Goal 2—universal primary education—should be deleted from the agenda. The question of what exactly education does to our minds and how it contributes to changing our preferences and our behaviour at the individual level is an immensely important field of research in which much remains to be studied. At the levels of individuals it has been argued that some of the higher income that people with higher education get is due to a so-called signalling effect (looking at the degree rather than the actual skills). At the aggregate level, however, there is strong evidence that as the proportions of birth cohorts get better educated, the positive consequences of education also increase over time. The implications of education in terms of better population health and higher economic growth do not diminish, as one would have expected had the observed differentials merely been due to selectivity. Quite the opposite, the positive effects of more education seem to be heightened through self-reinforcing effects of changing social norms and improving infrastructure once a critical mass is receiving better education.

Demographers can crucially contribute to the understanding of the returns to education

Much of the economic, sociological and political science literature that tried to empirically assess the returns to education at the societal level in terms of higher economic growth, better health and better governance and democracy has been seriously hampered in their efforts because the authors did not analyse age-specific data on educational attainment but typically studied the mean years of schooling of the entire adult population (15+ or 25+) as one presumably homogeneous group. Not surprisingly, many analysts were disappointed that the empirical regressions run across time series of many countries often did not consistently produce the significant positive effects of education that theory predicted. Demographers, however, know that during times of rapid educational expansion from one cohort to the next, the adult population above age 25 is very heterogeneous with respect to education. Take the example of South Korea: In the

1950s Korea was still a poor developing country and of the cohorts that were of school age during that period, the vast majority never attended school. Today the young cohorts in Korea are among the best educated in the world, with almost half of the young women having tertiary education. But at the same time even today among the women aged 75+ the majority has never even been to primary school. Hence, any indicator merging all these different age groups with the most extreme differences in educational attainment into a single number is not only rather meaningless in itself, but also does not relate statistically to other indicators during the years when economic growth in Korea took off as a consequence of much better educated cohorts entering the young working ages.

Using demographic methods of multi-state population dynamics, the educational attainment distributions by age (5-year age groups) and sex have recently been reconstructed to 1970 and projected to 2050 for most countries in the world (Lutz et al. 2007; KC et al. 2010). Using these new age-structured data, the old economic puzzle about the aggregate-level effects of improving educational attainment on economic growth have finally been resolved: a contribution entitled “The demography of educational attainment and economic growth” and published in *Science* (Lutz et al. 2008a) shows that universal primary education is not enough to start economic growth in poor developing countries; it needs to be associated with broad segments of the population having at least junior secondary education. This is an immensely important finding, not least for the current review of the Millennium Development Goals which still focus on universal primary education only. In a similar vein Lutz et al. (2010) published an article in *Population and Development Review* entitled “Demography, education and democracy: Global trends and the case of Iran” in which they clearly demonstrate the long-term effects of improvements in educational attainment—in particular for women—for a country moving towards more democratic rights and liberties. This study was only possible through differentiating educational attainment trends by age and sex. Many more studies along these lines are likely to be conducted by demographers and social scientists and will greatly benefit from the explicit consideration of all three dimensions.

In order to further advance this line of research, assemble and disseminate better and more consistent datasets of educational attainment, health and cognitive skills by age and sex, produce new science-based projections of populations by age, sex and level of educational attainment for all countries, and systematically study the returns to education on a broad spectrum of topics ranging from individual wellbeing to the long-term adaptive capacity to climate change, we are currently in the process of establishing the “Wittgenstein Centre for Demography and Global Human Capital”. It will be a collaborative effort of IIASA’s World Population Program, the Vienna Institute of Demography of the Austrian Academy of Sciences and the Vienna University of Economics and Business (WU) which is being facilitated by the funding associated with the Wittgenstein Prize, the highest Austrian science award. The main goal of this joint initiative of

the three institutions is to make an effort to enhance the relevance of demography through incorporating the ‘quality dimension’ and hence to help ensure that the title of this commentary, “Education will be at the heart of 21st century demography”, will be a correct prediction.

Acknowledgements

The author wishes to thank Bill Butz for his valuable comments on an earlier draft of this commentary. Research leading up to this contribution was in part supported by European Commission Grant ERC-2008-AdG 230195 Future Society.

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